

# DoD FUEL CELL DEMONSTRATION PROGRAM

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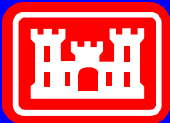
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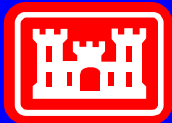


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# FY 1993 DoD Fuel Cell Demonstration Program

- The FY 1993 Appropriations Act provided \$6M in procurement funds per service for “non-developmental item natural gas fuel cells currently in production in the United States... for power generation at military installations” with the recommendation that “some of the fuel cells be installed at locations in need of enhanced air quality.”



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# Turn-key Package Purchased

- ONSI PC25B Fuel Cell Power Plant
- Engineering Design / Installation of Plant  
(coordination with local utility company)
- Training of Site Personnel
- 5 Years of Maintenance
- Diagnostic / Remote Monitoring Laptop Computer



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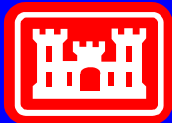
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# Site Selection Criteria

- Interest / Cooperation of Site Personnel
- Energy Costs / Savings
- Thermal Energy Utilization / Diversity
- Electric Energy Utilization / Diversity
- Geographic / Climatic Diversity
- Physical Considerations
- Environmental Considerations



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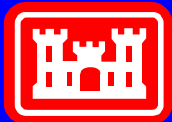
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# FY93 Sites

## Applications / Savings

	Bldg Type	DHW	Boiler Makeup	Condens. Return	Other	Estimated Savings \$\$
Natick, MA	Boiler Plant		YES	YES		\$47,000
Kirtland AFB, NM	Boiler Plant		YES			\$58,000
Picatinny Arsenal, NJ	Boiler Plant		YES			\$95,000
Naval Center, Newport, RI	Boiler Plant		YES			\$103,000
W.Point Academy, NY	Power Plant		YES			\$30,000
Camp Pendleton, CA	Hospital	YES	YES			\$97,000
Fort Eustis, VA	Field House	YES			Pool	\$38,000
29 Palms MCB, CA	Hospital	YES				\$46,000
Nellis AFB, NV	Barracks	YES			Heat Pump	\$34,000
Naval Academy, MD	Dining	YES				\$25,000
934th, MN	Boiler Plant			YES		\$17,000



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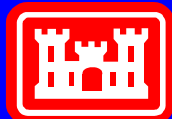
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# FY93 Fleet Performance

## As of 30 Jun 96

							(Adjusted for Wtr Chem) FC
SITE		ACCEPTANCE DATE	RUN Hrs	DOWN Hrs	(unadjusted) AVAILABILITY	Wtr. Chem. DOWN Hrs	AVAILABILITY
1	Natick	2/9/95	9858	2322	81%	1800	95%
2	Newport	2/10/95	10586	1570	87%		87%
3	934th Minn.	2/16/95	8399	3625	70%	2428	88%
4	29 Palms	6/23/95	4376	4504	49%	3556	82%
5	Kirtland	9/17/95	3305	3584	48%	3053	86%
6	Fort Eustis	9/18/95	2909	3956	42%	3173	* 79%
7	Nellis	10/16/95	2405	3784	39%	3509	90%
8	Picatinny	10/26/95	3950	2010	66%	1906	97%
9	Camp Pendleton	10/29/95	2564	3315	44%	2262	71%
10	West Point	12/13/95	4451	352	93%		93%
11							
Fleet TOTAL			52803	29022	65%	21686	88%

\* Includes voluntary shutdown hours during high gas prices

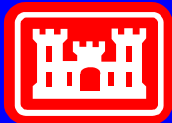


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# FY 1994 DoD Fuel Cell Demonstration Program

- The FY 1994 Defense Appropriations Act provided \$6.25M worth of equipment procurement funds per Service “to continue procurement of non-developmental item (NDI) 200 kW phosphoric acid natural gas fuel cells currently in production in the United States.”



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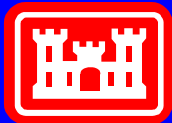
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# FY94 Turn-key Package

- ONSI PC25 Fuel Cell Power Plant  
(3 ea. Model B, 15 ea. Model C)
- Engineering Design / Installation
- Training for Site Personnel
- 56 Months Maintenance
- Diagnostic / Remote Monitoring Computer



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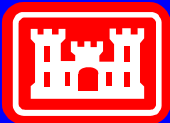
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# FY94 Sites Applications / Savings

## Air Force

Site	Building Application	Thermal Application	Estimated Savings
911th Airlift Wing, PA	Central Heat Plant	Space Heat	\$60,150
Laughlin AFB, TX	Hospital	Space Heat/Reheat/DHW	\$41,775
Westover ARB, MA	Central Boiler Plant	Boiler Makeup/Condensate	\$53,000
Little Rock AFB, AR	Hospital	Space Heat/Reheat	\$90,000
Davis Monthan AFB, AZ	Gymnasium	DHW/Absorption Chiller	\$61,396
Edwards AFB, CA	Hospital	DHW/Space Heat	\$93,000
Barksdale AFB, LA	Hospital	Space Heat/Reheat	\$40,000



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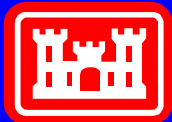
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# FY94 Sites

## Applications / Savings (cont.)

### Army

Site	Building Application	Thermal Application	Estimated Savings
Watervliet Arsenal, NY	Central Boiler Plant	Boiler Makeup Water	\$76,000
Ft. Huachuca, AZ	Barracks	Space Heat/DHW	\$66,816
Ft. Richardson, AK	Armory Building	Space Heat/DHW	\$67,273
Ft. Bliss, TX	Laundry	Process Hot Water	\$56,000
Pine Bluff, AR	Boiler Plant	Boiler Feed Water	\$61,000



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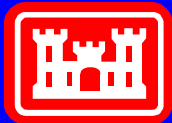
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# FY94 Sites

## Applications / Savings (cont.)

### Navy

Site	Building Application	Thermal Application	Estimated Savings
NAS Jacksonville, FL	Hospital	Space Heat/Reheat/DHW	\$90,000
NAS Fallon, NV	Galley	DHW	\$58,438
Stennis Space Center, MS	Office Building	Space Heat/Reheat	\$38,969
Navy Subase-Groton, CT	Boiler Plant	Boiler Feed Water	N/A
CBC, Port Hueneme, CA	Swimming Pool	Pool	\$66,000



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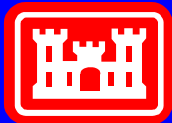
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# FY94 Sites

## Applications / Savings (cont.)

### Other DoD

Site	Building Application	Thermal Application	Estimated Savings
National Defense Center for Environmental Excellence (NDCEE), PA	Office/Research Lab	Heat for Chemical Evaporator	\$29,000

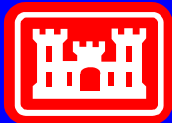


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# Climate Change Fuel Cell Program

- \$15 million available in FY95
- Provides Federal Grants up to \$1000/kw
- Priority given to units intended for DoD sites



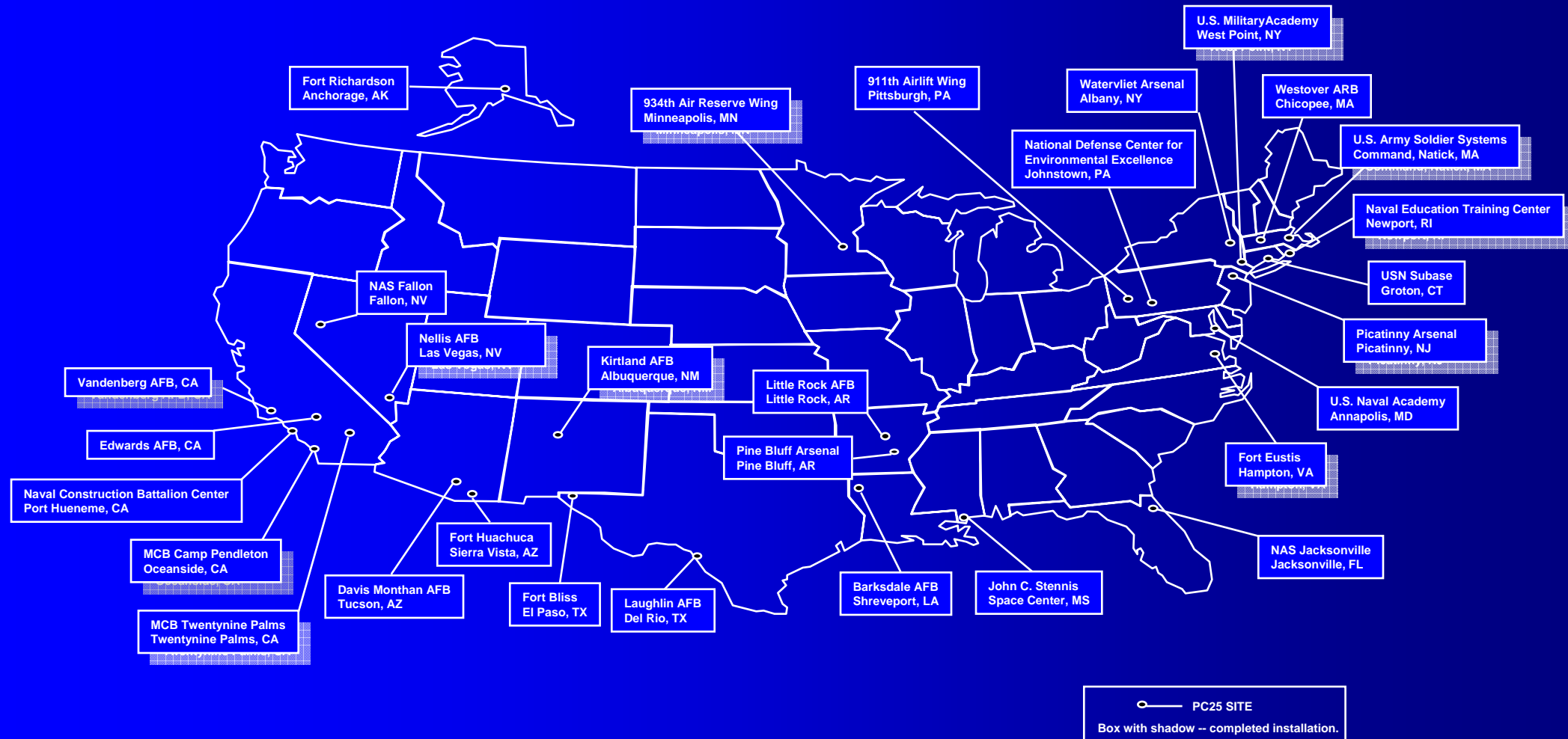
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# PC25 POWER PLANT DoD SITES



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